

Key Concepts Review Chapter 1

1. Solve an equation for one variable in terms of another.

- a) Solve for x : $a - 2[b - 3(c - x)] = 6$ b) Solve for a : $\frac{a+1}{b} = \frac{a-1}{b} + \frac{b+1}{a}$
- c) Solve for i : $A = P\left(1 + \frac{i}{100}\right)^2$ d) Solve for r : $S = \frac{a}{1-r}$
- e) Solve for c : $\frac{1}{s+a} + \frac{2}{s-a} = \frac{5}{s+c}$

2. Solve a quadratic equation. (Simplify your answers.)

- a) $3x^2 - 12x - 1 = 0$ b) $5x = 2x^2 + 1$
- c) $2x^2 + 12x + 1 = 0$ d) $2x^2 + 4x + 3 = 0$
- e) $x^2 + 10 = -6x$

3. Simplify an expression involving complex numbers. (Express answers in the form $a + bi$.)

- a) $(2 - \sqrt{-2})(\sqrt{8} - \sqrt{-4})$ b) $(1 - \sqrt{-3})(2 + \sqrt{-4})$
- c) $\frac{1 - \sqrt{-1}}{1 + \sqrt{-1}}$ d) $\frac{2 + \sqrt{-8}}{1 + \sqrt{-2}}$ e) $(2 - \sqrt{-36})^{-1}$

4. Solve an equation by factoring.

- a) $x^6 + 9x^4 - 4x^2 - 36 = 0$ b) $2(x-4)^{\frac{7}{3}} - (x-4)^{\frac{4}{3}} - (x-4)^{\frac{1}{3}} = 0$
- c) $x^{\frac{1}{2}} - 3x^{\frac{1}{3}} = 3x^{\frac{1}{6}} - 9$ d) $x^{\frac{1}{2}} + 3x^{-\frac{1}{2}} = 10x^{-\frac{3}{2}}$ e) $x^2\sqrt{x+3} = (x+3)^{\frac{3}{2}}$

5. Solve a rational inequality. (Express answers using interval notation.)

- a) $\frac{x}{x+2} \leq \frac{1}{x}$ b) $\frac{2x+5}{x+1} \leq 1$ c) $\frac{9}{x} < x$
- d) $\frac{3}{x-1} - \frac{x}{x+1} \geq 1$ e) $-3 \leq \frac{x+1}{x-3}$

6. Solve an inequality involving absolute value.

- a) $3 - |2x + 4| \leq 1$ b) $4|3 - x| + 3 \geq 15$
- c) $2\left|\frac{1}{2}x + 3\right| + 3 \leq 51$ d) $\left|\frac{x+1}{2}\right| > 6$ e) $\left|\frac{x-2}{3}\right| < 2$